CLAIMS

What is claimed is:

1. A method of forming a drug-carrier complex, comprising the step of combining at least one nucleotide strand with a drug, whereby said drug and said nucleotide strand reversibly associate with each other to form a drug-carrier complex.

2. The method of Claim 1, wherein said drug is an oligonucleotide.

3. The method of Claim 1, wherein said drug is an antisense oligonucleotide.

4. The method of Claim 1, wherein said drug is a ribozyme.

5. The method of Claim 1, wherein said drug includes a component selected from the group consisting of an intercalator, a metal containing substance, a minor groove binder and a major groove binder.

6. The method of Claim 1, wherein said drug includes at least one amino group.

7. The method of Claim 1, wherein said drug is combined with at least two nucleotide strands, and wherein said nucleotide strands hybridize with each other.

8. The method of Claim 1, wherein a second nucleotide strand is combined with said drug-carrier complex, whereby said second nucleotide strand hybridizes with said nucleotide strand of said drug-carrier complex.

9. A method of forming a drug-carrier complex, comprising the steps of combining a drug with at least two nucleotide strands that hybridize with each other, whereby said drug associates with said nucleotide strands to form a water soluble drug-carrier complex.

10. The method of Claim 9, further including the step of lyophilizing said dissolved drug-carrier complex.

11. A method of forming a drug-carrier composition, comprising the steps of:

a) combining a drug component and a nucleotide component; and

b) lyophilizing the combined drug and nucleotide components, thereby forming said drug-carrier composition.

12. The method of Claim 11, wherein at least one of said drug component and said nucleotide component are dissolved in water prior to combining the components.

13. A method of forming a drug-carrier composition, comprising the steps of:

a) lyophilizing a drug component;

b) lyophilizing a nucleotide component; and

c) combining said lyophilized drug component and said lyophilized nucleotide component, thereby forming said drug-carrier composition.

14. A drug carrier, comprising:

a) a double-stranded nucleotide; and

b) a polymer component covalently bonded to at least one strand of said double stranded nucleotide, said polymer component having an aqueous solubility of at least one mg/liter at 25°C.

15. The drug carrier of Claim 14, wherein said polymer component is a biocompatible polymer component.

16. The drug carrier of Claim 15, wherein said biocompatible polymer component is cross-linked.

17. The drug carrier of Claim 15, wherein said biocompatible polymer component is selected from the group consisting of a polysaccharide, a polyether and a polyacetal.

18. The drug carrier of Claim 17, wherein said polysaccharide is selected from the group consisting of chondroitinsulfate, poly α-D-glucose, polysialic acid, dextran, starch and derivatives thereof.

19. The drug carrier of Claim 17, wherein said polyacetal is selected from the group consisting of poly(hydroxymethylethylene hydroxymethylformal) and derivatives thereof.

20. The drug carrier of Claim 14, wherein said polymer component includes at least one polymer, said polymer being covalently bonded to at least one strand of said nucleotide.

21. The drug carrier of Claim 14, wherein said polymer component includes at least two polymers.

22. The drug carrier of Claim 14, wherein said polymer component includes at least two chemically distinct polymers.

23. A drug carrier, comprising:

a) a double-stranded nucleotide; and

b) an oligomer component covalently bonded to at least one strand of said double-stranded nucleotide.

24. The drug carrier of Claim 23, wherein said oligomer component includes at least one member selected from the group consisting of an oligosaccharide and an oligopeptide.

25. The drug carrier of Claim 23, wherein said oligomer component includes at least one oligomer, said oligomer being covalently bonded to at least one strand of said nucleotide.

26. The drug carrier of Claim 23, wherein said oligomer component includes at least two oligomers.

27. The drug carrier of Claim 26, wherein said oligomer component includes at least two chemically distinct oligomers.

28. A drug-carrier complex, comprising:

a) a single-stranded nucleotide;

b) a drug reversibly associated with said single-stranded nucleotide; and

c) a polymer associated with said single-stranded nucleotide or said drug.

29. The drug-carrier complex of Claim 28, wherein said polymer is covalently associated with said single-stranded nucleotide.

30. The drug-carrier complex of Claim 28, wherein said polymer is associated with said drug.

31. A drug-carrier complex, comprising:

a) a single-stranded nucleotide;

b) an oligomer associated with said single-stranded nucleotide; and

c) a drug reversibly associated with the oligomer or the single-stranded nucleotide.

32. The drug-carrier complex of Claim 31, wherein said oligomer is covalently associated with said single-stranded nucleotide.

33. The drug-carrier complex of Claim 31, wherein said oligomer is associated with said drug.

34. A drug-carrier, comprising:

a) a single-stranded nucleotide; and

b) at least two polymers are associated with said single-stranded nucleotide.

35. A drug-carrier complex, comprising:

a) an oligomer;

b) a single-stranded nucleotide entrapped by said oligomer; and

c) a drug reversibly associated with said single stranded nucleotide.

36. A drug-carrier composition comprising:

a) a nucleotide carrier component; and

b) a drug component,

said drug-carrier composition having a moisture content less than about 5% by weight.

37. A drug-carrier composition consisting essentially of a drug component and a nucleotide component.

38. A pharmaceutical formulation, comprising:

a) a nucleotide carrier component; and

b) a drug in reversible association with said nucleotide carrier component.

39. The pharmaceutical formulation of Claim 38, wherein said drug is an oligonucleotide.

40. The pharmaceutical formulation of Claim 38, wherein said drug is an antisense nucleotide.

41. The pharmaceutical formulation of Claim 38, wherein said drug is a ribozyme.

42. The pharmaceutical formulation of Claim 38, wherein said drug includes a component selected from the group consisting of an intercalator, a metal, a minor groove binder, and a major groove binder.

43. The pharmaceutical formulation of Claim 38, wherein said drug includes an amino group.

44. The pharmaceutical formulation of Claim 38, wherein the reversible association between said drug and said nucleotide carrier component includes at least one member selected from the group consisting of a van der Waals force, an electrostatic interaction, a hydrogen bond, an ionic bond, a hydrophobic interaction and a donor/acceptor bond.

45. The pharmaceutical formulation of Claim 44, further including a reversible covalent bond between said drug and said nucleotide carrier component.

46. The pharmaceutical formulation of Claim 38, wherein the reversible association between said drug and said nucleotide carrier component is an intercalation.

47. The pharmaceutical formulation of Claim 38, wherein said nucleotide carrier component is a polynucleotide carrier component.

48. The pharmaceutical formulation of Claim 38, wherein said nucleotide carrier component is an oligonucleotide carrier component.

49. The pharmaceutical formulation of Claim 38, wherein said drug is a therapeutic drug.

50. The pharmaceutical formulation of Claim 38, wherein said drug is a diagnostic drug.

51. The pharmaceutical formulation of Claim 50, wherein said diagnostic drug is selected from the group consisting of a radioactive diagnostic drug, a flourescent diagnostic drug, a paramagnetic diagnostic drug, superparamagnetic diagnostic drug, an x-ray dense diagnostic drug and an electron-dense diagnostic drug.

52. The pharmaceutical formulation of Claim 38, wherein said drug is a protein.

53. The pharmaceutical formulation of Claim 38, wherein said drug is a chemical selected from the group consisting of an intercalator, a metal, a minor groove binder, and a major groove binder.

54. The pharmaceutical formulation of Claim 38, wherein said drug includes a diagnostic label.

~~58.~~ A method of delivering a drug to an organism, comprising administering a drug-carrier complex to said organism, wherein said drug-carrier complex includes a nucleotide carrier and a drug, said nucleotide carrier and said drug being in reversible association with each other.

56. The method of Claim 55, wherein the reversible association of said drug and said nucleotide carrier is selected from the group consisting of a van der Waals force, an electrostatic interaction, a hydrogen bond, an ionic bond, a hydrophobic interaction and a donor/acceptor bond.

57. The method of Claim 55, wherein the reversible association between said drug and said nucleotide carrier component is an intercalation.

58. The method of Claim 55, wherein said organism is selected from the group consisting of a mammal and a cell.

59. The method of Claim 55, wherein said nucleotide carrier is administered into said organism.

60. The method of Claim 55, wherein said nucleotide carrier is administered proximate to said organism.

~~61.~~ A method of delivering a drug to a tissue culture, comprising administering a drug-carrier complex to said tissue culture, wherein said drug-carrier complex includes a nucleotide carrier and a drug, said nucleotide carrier and said drug being in reversible association with each other.

62. The method of Claim 61, wherein the reversible association of said drug and said nucleotide carrier is selected from the group consisting of a van der Waals

force, an electrostatic interaction, a hydrogen bond, an ionic bond, a hydrophobic interaction and a donor/acceptor bond.

63. The method of Claim 61, wherein the reversible association between said drug and said nucleotide carrier component is an intercalation.

64. The method of Claim 61, wherein said nucleotide carrier is administered into said tissue culture.

65. The method of Claim 61, wherein said nucleotide carrier is administered proximate to said tissue culture.

66. A method of delivering a drug to an organism, comprising the step of administering a drug and a nucleotide strand, which reversibly associates with said drug to form a drug-carrier complex, to said organism.

67. The method of Claim 66, wherein said drug and said nucleotide strand are administered simultaneously to said organism.

68. The method of Claim 66, wherein said drug and said nucleotide strand are administered separately to said organism.

69. A method of delivering a drug to an organism, comprising the steps of:

a) forming a drug-carrier complex that includes a drug and a nucleotide strand in reversible association with said drug; and

b) administering said drug-carrier complex to said organism.

70. A method of delivering a drug to an organism, comprising the step of administering to said organism a drug-carrier complex, wherein said drug-carrier

complex includes a drug component and a carrier component, and wherein said drug component and said carrier component are in reversible association with each other, whereby said drug can dissociate from said drug-carrier complex and reassociate with said carrier component.

71. The method of Claim 70, wherein said carrier is a nucleotide carrier.

72. The method of Claim 70, wherein said drug-carrier complex is delivered to a combination of cells in said organism.

73. The method of Claim 72, wherein said combination of cells is a tumor.

74. The method of Claim 72, wherein said combination of cells is a pathogenic.

75. The method of Claim 72, wherein said combination of cells is a tissue culture.

76. The method of Claim 72, wherein said combination of cells is an organ.

77. The method of Claim 70, whereby said drug-carrier complex dissociates near or within a combination of cells within said organism.

78. The method of Claim 77, wherein said drug-carrier complex is administered to said organism at a point remote from said combination of cells.

79. A method for increasing aqueous solubility of a substance, comprising the step of reversibly associating said substance with a nucleotide carrier, whereby said substance and said nucleotide carrier form a water-soluble complex.

80. The method of Claim 79, wherein said substance is essentially insoluble in water.

81. A targeted carrier, comprising:

a) a nucleotide;

b) a polymer component associated with said nucleotide; and

c) a ligand associated with said nucleotide or said polymer component and associable with a cell or tissue marker, wherein said cell or tissue marker is selected from the group consisting of proteins, peptides, carbohydrates, lipids and nucleotides.

82. A targeted carrier, comprising:

a) a nucleotide; and

b) a polymer component associated with said nucleotide, said polymer component being a ligand associable with a cell or tissue marker, wherein said cell or tissue marker is selected from the group consisting of proteins, peptides, carbohydrates, lipids and nucleotides.

83. A targeted drug-carrier complex, comprising:

a) a nucleotide;

b) a drug reversibly associated with said nucleotide; and

c) a targeting component associated with said nucleotide or said drug, said targeting component including a ligand associable with a cell or tissue marker, wherein said cell or tissue marker is selected from the group consisting of proteins, peptides, carbohydrates, lipids and nucleotides.

84. A targeted drug-carrier complex, comprising:

a) a nucleotide;

b) a drug reversibly associated with the nucleotide;

c) a polymer component associated with said nucleotide or said drug; and

d) a targeting component associated with said nucleotide, said drug or said polymer, said targeting component including a ligand associable with a

cell or tissue marker, wherein said cell or tissue marker is selected from the group consisting of proteins, polypeptides, carbohydrates and lipids.

85. A drug delivery system, comprising:

a) a matrix;

b) a nucleotide, wherein said nucleotide is associated with or entrapped within said matrix; and

c) a drug reversibly associated with said nucleotide.

86. The drug delivery system of Claim 85, wherein said matrix is a gel.

87. The drug delivery system of Claim 85, wherein said matrix is a film.

88. The drug delivery system of Claim 85, wherein said matrix is a particle or a vesicle.

89. The drug delivery system of Claim 85, wherein said matrix is a material reversibly cross-linked through a nucleotide/nucleotide association.

90. The drug delivery system of Claim 85, wherein drug release destabilizes said matrix.

91. An implant, comprising:

a) an implant matrix;

b) a nucleotide, wherein said nucleotide is associated with or entrapped within said matrix; and

c) a drug, wherein said drug is in reversible association with said nucleotide.

92. The implant of Claim 91, wherein said matrix is a biocompatible gel.

93. The implant of Claim 91, wherein said matrix is a biocompatible film.

94. The implant of Claim 91, wherein said matrix is selected from the group consisting of a biocompatible particle, vesicle, foam, fabric, suture, and sponge.

95. The implant of Claim 91, wherein said matrix is a material reversibly cross-linked through a nucleotide/nucleotide association.

96. The implant of Claim 91, wherein drug release destabilizes said implant matrix.

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